

## The economic impact of hard-to-heal wounds: promoting practice change to address passivity in wound management



**Authors:**  
Professor Peter Vowden  
Kathryn Vowden

As the prevalence and incidence of wounds are predicted to increase due to an ageing population with increasing comorbidities, reducing the burden of wounds by optimising healing is seen as a key factor in lowering wound care costs. Inappropriate or delayed treatment adversely affects the time to wound healing, impacting quality of life, and increasing the burden on patients, their families and carers, society and the health economy. Identifying non-healing wounds is vital to cost reduction. Failure to recognise wounds not progressing towards healing increases the subsequent risk of non-healing and places the patient at unnecessary increased risk of wound complications.

**W**ound healing is a complex cascade of events that occurs in a recognised sequence and time frame. This intricate process can be interrupted by numerous patient-, wound-, comorbidity-, biophysiological- or care-related factors, all of which can delay or prevent wound healing. Early recognition and appropriate corrective treatment is necessary as delayed treatment affects healing<sup>[1]</sup>, resulting in increased burden to patients, society and the economy<sup>[2,3]</sup>.

### Hard-to-heal wounds: the financial challenges

In 2009, the management of chronic wounds was estimated to cost the NHS between £2.5bn and £3.1bn per annum, accounting for 3% to 4% of the healthcare budget<sup>[4]</sup>. A further analysis of NHS wound care costs in 2012/2013, estimated the cost of wound care and associated comorbidities for acute and chronic wounds was between £4.5bn and £5.1bn per annum. Some £3.2bn went on treating the 40% of wounds with delayed healing<sup>[3,5]</sup>. Furthermore, Fife et al<sup>[6]</sup> estimated the cost of wound care in the US was approximately \$50bn per annum, representing 5% of the total annual spend on both Medicare and Medicaid, combined with \$25bn spent annually on the treatment of chronic wounds<sup>[7]</sup>.

Since the prevalence and incidence of wounds are likely to increase with the ageing population, and given the predicted rise in

comorbidities that affect healing potential, including diabetes, cardiac disease and obesity, these costs will inevitably rise unless wound care becomes more efficient and effective. To overcome these increases in demand and case complexity, a change in service management is required to reduce healing times and improve outcomes, including levels of wound recurrence. However, in today's financially challenged health systems, much emphasis is directed to dressing procurement and unit costs, rather than the total cost for an episode of care and subsequent outcome<sup>[8]</sup>.

Guest and Vowden<sup>[8]</sup> highlight the false economy of reducing dressing cost and agree that a review of the delivery of wound care service with an emphasis on wound diagnosis and early, appropriate treatment would be a more effective method of reducing overall cost.

### Cost drivers in wound management

To allow for efficient wound management, it is important to address factors that influence the economic and human costs of wound management. The cost of dressings, devices and diagnostic equipment is accepted, but another important economic driver is healthcare professional time, impacted notably by duration of care, occurrence of complications, and dressing change frequency<sup>[9,10]</sup>.

According to a recent freedom of information request, the cost of a hospital stay is estimated to be £400 per day<sup>[11]</sup>, with studies showing that

### Acknowledgement

This article was sponsored by Acelity

**Professor Peter Vowden** is Honorary Consultant Surgeon, Bradford Teaching Hospitals NHS Foundation Trust and Visiting Honorary Professor of Wound Healing Research, University of Bradford; **Kathryn Vowden** is Lecturer, University of Bradford and Honorary Nurse Consultant, Bradford Teaching Hospitals NHS Foundation Trust

wounds of more than 6 months' duration are at a greater risk of admission or extended hospital stay compared with wounds of a shorter duration<sup>[12]</sup>. Within the normal parameters of acute wound healing, re-epithelialisation should be reached within 4 weeks. When healing is delayed, which can occur for numerous reasons<sup>[13]</sup>, a wound can become chronic<sup>[1]</sup>.

Chronic wounds can be difficult to treat and are costly to healthcare systems<sup>[2,3]</sup>, requiring a lengthened period of care, with increased patient dependency and risk of developing complications; infection, for example, can incur intensive or specialist treatments, long hospital stays, and a high number of readmissions<sup>[2]</sup>.

Secondary care interventions may also be necessary to treat the underlying cause of a wound and so reduce healing times and likelihood of recurrence, e.g. management of venous disease as part of the treatment of venous ulceration<sup>[14]</sup>. Guest et al<sup>[5]</sup> reported that the community bears 66% of the total annual NHS cost of caring for patients with wounds and associated comorbidities. The distribution of costs varied according to wound type, with 48% of costs for acute wounds incurred in the community, compared with 78% for chronic wounds. Another survey of 1,735 patients with acute and chronic wounds from UK region revealed 32% of patients were treated in acute care as an inpatient or outpatient<sup>[15]</sup>.

These studies indicate that healthcare professionals working in all care environments manage patients with acute and chronic wounds, and should therefore be competent in the fundamentals of wound management and aware of current guidance on different wound types.

## Chronicity and cost of wound management across wound types

Evidence exists across wound types demonstrating the impact of chronicity on costs. Dealey et al<sup>[16]</sup> suggest the estimated cost of healing a grade 4 pressure ulcer is 10 times more than for a grade 1 ulcer, while Bennett et al<sup>[17]</sup> found that grade 4 pressure ulcers with complications were more expensive to heal than those without complications (£9,670 vs. £7,750). Costs increase as the time to heal is greater and incidence of complications higher.

Guest et al<sup>[2,5]</sup> have estimated that the NHS treated 278,000 leg ulcers in 2012-2013 at a cost per patient of between £788 (healed) and £4,472 (unhealed) to manage the wound and associated morbidities. In the US, incremental medical costs associated with VLU were estimated to be

between \$6,391-\$7,086; in addition, patients with VLUs missed more time from work than matched controls<sup>[18]</sup>. Moreover, only about 50% of VLUs will heal within 4 months, 20% will have not healed within 2 years, and approximately 8% have not healed after 5 years<sup>[19]</sup>.

For DFUs, the equivalent cost has been estimated to be \$10,604 (range \$1,444-\$85,718)<sup>[20]</sup>. In Canada, average 3-year cumulative cost for DFUs was estimated at C\$52,360<sup>[21]</sup>. According to the Centers for Disease Control and Prevention<sup>[22]</sup>, 50% of DFUs will become infected and approximately 25% of these patients require either a minor or major lower limb amputation. As such, once ulceration has occurred, it is vital to aim for quick healing to reduce the risk of infection and the associated increased likelihood of amputation.

## The economic impact of inappropriate care

Various challenges increase the difficulty of efficacious and cost-effective wound treatment; notable is a lack of awareness of the complexity of wound management beyond the choice of dressing. Studies have shown that 26% of patients with leg or foot ulcers have no definite diagnosis<sup>[23]</sup>, many patients with foot ulcers have not undergone investigations to determine wound aetiology, and 50%-60% of patients with VLUs have not been treated with compression<sup>[24,25]</sup>. Similar findings were reported by Vowden and Vowden<sup>[26]</sup>, with lack of full assessment (Doppler) or diagnosis for many patients, and some inappropriate treatment selections.

The Burden of Wounds Study<sup>[3,5]</sup> showed that despite published guidelines and Best Practice statements [Table 1] many of these deficiencies continue in current practice, with 30% of wounds lacking a differential diagnosis and only 16% of cases with leg or foot ulceration having a Doppler ankle brachial pressure index recorded. Lack of best practice implementation is a substantial contributor to wound care burden, as more and more wounds stall during the healing process. As such, it is vital not only that interventions are effective in terms of improving outcomes, but also that patients and clinicians understand, and are willing and able to adhere to appropriate protocols<sup>[10]</sup>.

The guidelines in Table 1 emphasise the importance of careful and repeated wound assessment, including wound measurement and documentation as part of care delivery. It is only by doing so, and auditing outcomes

Table 1: Selection of available guidelines and best practice statements relevant to wound management<sup>(1-2)</sup>.

Guideline/organisation	Guidelines with reference to wound management
National Institute for Health and Care Excellence (NICE) Available at: <a href="https://www.nice.org.uk">https://www.nice.org.uk</a>	<ul style="list-style-type: none"> <li>■ Diabetic foot problems: prevention and management [NG19] – August 2015</li> <li>■ Diabetic foot problems: inpatient management of diabetic foot problems [CG119] - March 2011</li> <li>■ Peripheral arterial disease: diagnosis and management [CG147] – August 2012</li> <li>■ Pressure ulcers: prevention and management [CG179] – April 2014</li> <li>■ Surgical site infections: prevention and treatment [CG74] – October 2008</li> <li>■ Varicose veins: diagnosis and management [CG168] – July 2013</li> </ul>
Scottish Intercollegiate Guidelines Network (SIGN) Available at <a href="http://www.sign.ac.uk">www.sign.ac.uk</a>	<ul style="list-style-type: none"> <li>■ Management of diabetes [SG 116]</li> <li>■ Diagnosis and management of peripheral arterial disease [SG 89]</li> <li>■ Management of chronic venous leg ulcers [SG 120]</li> </ul>
National Pressure Ulcer Advisory Panel (NPUAP); European Pressure Ulcer Advisory Panel (EPUAP); Pacific Pressure Injury Alliance (PPPIA) Guidelines Available from <a href="http://www.epuap.org">www.epuap.org</a>	NPUAP-EPUAP-PPPIA Pressure Ulcer Treatment & Prevention, 2014 Quick Reference Guide (Updated 16/10/14)
International Working Group on the Diabetic Foot (IWGDF) Available from: <a href="http://www.iwgdf.org">www.iwgdf.org</a>	IWGDF Guidance on the management and prevention of foot problems in diabetes 2015 Guidance documents concerning: Prevention; Footwear and Offloading; Peripheral Artery Disease; Infection; Wound Healing
Best Practice Statements Available from: <a href="http://www.woundsinternational.com">www.woundsinternational.com</a> <a href="http://www.wounds-uk.com">www.wounds-uk.com</a>	<p>International Best Practice Guidelines include:</p> <ul style="list-style-type: none"> <li>■ Wound Management in Diabetic Foot Ulcers</li> <li>■ Optimising patient involvement in wound management</li> </ul> <p>A variety of “Best Practice Statements” are also available from Wounds UK and including:</p> <ul style="list-style-type: none"> <li>■ Effective exudate management</li> <li>■ The use of topical antimicrobial agents in wound management</li> <li>■ Effective management of wound infection and quality of life</li> <li>■ Care of the older person's skin</li> <li>■ Eliminating pressure ulcers</li> <li>■ Principles of wound management in paediatric patients</li> <li>■ Compression Hosiery</li> <li>■ Minimising Trauma and Pain in Wound Management</li> <li>■ Optimising Wound Care</li> </ul>
European Wound Management Association (EWMA) Available from <a href="http://www.ewma.org">www.ewma.org</a>	<ul style="list-style-type: none"> <li>■ EWMA - Debridement Document</li> <li>■ EWMA - Antimicrobial Document</li> <li>■ EWMA - Managing Wounds as a Team</li> <li>■ EWMA Home Care - Wound Care Document</li> </ul>

carefully, that wounds failing to heal can be identified. Indications are that wounds likely to have a slow or non-healing trajectory can be predicted as early as the second to fourth week of care<sup>[27,28]</sup>, allowing early care plan revision and possible introduction of alternative, advanced therapies.

### Human cost of living with a wound

The economic evidence is becoming increasingly compelling<sup>[5]</sup>, but there is also a human cost of living with a wound. Wounds impact patients' physical, mental and social wellbeing, and adversely affect families and

carers<sup>[29]</sup>. While outcomes are most often measured in terms of wound progress, patients may have different priorities, such as:

- reduction in pain or malodour,
- reduction in exudate levels, and
- comfort and appearance of the wound or dressings used<sup>[30]</sup>.

For younger patients, a wound may impact work and income, while for all patients there are a range of issues that adversely impact daily living, with pain, exudate, odour, mobility and sleep all identified as challenges<sup>[31,32]</sup>. These issues are multiplied by wound chronicity and fear of recurrence,

and are associated with both anxiety and depression<sup>[33]</sup>.

## The role of advanced wound dressings

Restructure of care methods, including consideration of advanced technologies, is needed to address these issues. The introduction of biotechnologies and advanced wound care products into the care pathway can be challenging within a tight budget, due to the perceived high unit cost. However, payers and decision-makers should take the total cost of care into account when deciding upon appropriate allocation of their financial resources and the inclusion of these products within formulary, not just unit costs<sup>[34]</sup>.

The longer a wound is left without appropriate treatment, the more likely it is to stall during healing, increasing the cost burden<sup>[1]</sup>, but the potential to release resources by utilising more effective wound care pathways compared with standard care is often overlooked<sup>[35]</sup>. There is a need to increase understanding of why wounds become hard-to-heal in order to inform and target treatment protocols<sup>[1]</sup>.

The definition of 'advanced wound care therapy' covers interventions used when standard wound care has failed. The existing selection of advanced therapies is large and growing, with a variety of interventions available for different indications<sup>[36]</sup>. Indeed, although advanced treatments are often more expensive per unit, it can make sense in terms of overall economic and clinical outcome to use these products where standard care has not achieved the intended outcome.

Choosing an advanced wound care therapy could lead to earlier control of symptoms, promotion of wound closure, improved patient wellbeing and quality of life and, ultimately, reduced cost burden<sup>[37]</sup>. Increasing understanding of the barriers to healing and development of cost-effective diagnostics will further assist product choice and improve the economic argument for use of these products<sup>[38]</sup>.

## Conclusion

Wound care is an expensive, labour intensive, but necessary element of healthcare provision, accounting for up to 4% of the healthcare budget, much of which is directed towards management of wounds in the community. Inevitably, there are pressures to reduce costs and, currently, these are largely procurement driven. Such an emphasis may reduce costs initially but fails to address the more important issues of service delivery and enhanced patient

outcomes. Accurate assessment and careful monitoring of healing progress are vital to address the patient, society and healthcare costs of delayed wound healing; only this way can appropriate, individualised wound management plans be developed, advanced wound care products be used effectively, and long-term costs be reduced.

WINT

## References

